THE BODY: AN AIDS AND HIV INFORMATION RESOURCE

Positive Living

A monthly publication for people with HIV/AIDS
From AIDS Project Los Angeles
October 1998

EXHIBIT B

Treatment News

Looking at AIDSVAX and other vaccine trials

by Nina Marks

With recent media coverage of the launch of a Phase III trial of AIDSVAX, a preventative HIV vaccine, many people may have questions.

Who are vaccines for? How do they work? Where are we in terms of research and development on a vaccine for HIV?

Starting with the basics, this article will provide some information that will help to clarify these and other issues.

What is a vaccine?

A vaccine is a preparation that contains an infectious agent or its components that is given to stimulate an immune response that will protect a person from illness due to that agent.

A therapeutic (treatment) vaccine is given after infection and is intended to reduce or arrest disease progression. A preventative (prophylactic) vaccine is intended to prevent initial infection by a disease-causing virus. Agents used in vaccines may be whole-killed (inactive), live-attenuated (weakened) or artificially manufactured. People who are given preventative vaccines will always test antibody-positive (HIV-positive) by commercially available HIV-antibody tests.

Vaccine possibilities

Vaccines fall into one of a variety of classes. Types of vaccines include:

- **Whole-killed.** This vaccine is made from entire viruses that have been inactivated (killed) in the laboratory and are intended for uninfected individuals. Because all parts of the virus are used in the preparation, the immune system responds to a broad range of antigens (substances foreign to the body). Whole-killed vaccines are used for polio and flu, and are based on some of the oldest vaccine technologies. Even though it has been shown that HIV can be safely inactivated, there are no private companies

developing a preventative whole-killed vaccine at this time.

Another variation of killed virus is REMUNE HIV Immunogen, a therapeutic, vaccine-like preparation for people who are HIV-positive already. It is made from whole inactivated virus with the viral protein envelope deleted (removed). A substance called an adjuvant is added to enhance or boost the effect of the vaccine. Often referred to as the "Salk vaccine," REMUNE is being investigated as an immunotherapy, and is the only vaccine being studied in HIV-positive individuals. The product has been used in humans for more than 10 years but has not yet been approved by the Food and Drug Administration.

- **Live attenuated.** This type of vaccine would be used in people not infected with HIV. Once vaccinated with a live weakened (attenuated) strain of HIV that is capable of replicating but not causing illness, an individual would theoretically be protected from disease-causing (pathogenic) strains, should they become exposed to them. Studies in monkeys using a live attenuated vaccine made from Simian Immunodeficiency Virus (SIV) have demonstrated superior defense to new infection with wild-type (natural) virus. There is concern however, that attenuated HIV, once in the human body, may have the potential to mutate into a disease-causing strain. Although live attenuated vaccines are now being used for measles and polio, no private sector company is working on a similar vaccine against HIV for testing in humans.

- **Recombinant subunit.** This preparation is of synthetic (man-made) single proteins copied from the outer coating or envelope of HIV (such as gp120) and other proteins (like p24). The proteins are absorbed by cells normally infected by HIV, processed, and then present themselves on the surface of the cell causing the immune system to respond. AIDSVAX is this type of vaccine and is also designed to protect people who are not HIV-infected from disease-causing strains. Recombinant subunit vaccine technology was originally used against hepatitis B.

- **Live vector.** Other recombinant subunit vaccines being studied involve the use of a mechanism known as a vector. A vector is a harmless, non-disease-causing virus (such as canarypox or cowpox) or bacteria (like weakened salmonella) that transports the HIV proteins (or genetic material) into the body where an immune response to HIV can be induced.

  ALVAC, now in Phase II clinical trials for HIV-negative people, is one such vaccine. In some trials, the initial vaccine is followed by "booster" injections of subunit vaccine (see above) that do not include the vector. This is known as a prime boost combination.

- **Peptide.** Peptide vaccines are made from synthesized HIV peptides (tiny components of protein). The peptides are taken into the immune cells that are then recognized as "infected" by the immune system and an immune response is produced. Peptide vaccine has been studied in HIV-negative people without demonstrating much potential, but some research continues

in this area.

- **DNA.** This vaccine consists of selected HIV genetic material (DNA) which are injected into the body. Again, the genes are taken up by immune cells, making them capable of producing selected HIV proteins and bring on an immune response. DNA vaccines are relatively inexpensive to manufacture, and in animal studies have shown an ability to generate cellular immune response (the production of cells that kill infected cells) and humoral immune response (the production of antibodies that destroy circulating virus). DNA vaccine Phase I trials are currently under way in the U.S. for HIV-negative people.

- **Virus-like particle (VLP, psuedovirion).** VLP vaccines are made of non-infectious particles that resemble HIV and contain some HIV proteins. They are constructed with just enough viral protein to be immunogenic (capable of provoking an immune response) and are intended for use as a preventative immunization in HIV-negative individuals. Pasteur-Merieux-Connaught, a manufacturer of childhood vaccines, is currently developing a virus-like particle pseudovirion product.

For additional information on HIV vaccine research and development, visit these web sites: http://www.vactup.com, http://www.iavi.org, and http://www.iapac.org. *Internet access is available in the HIV Resource Center at AIDS Project Los Angeles.*

Nina Marks, APLA treatment advocate, can be reached at (323) 993-1486 or by e-mail at Nmarks@APLA.org.